

FAA AVIATION NEWS

SEPTEMBER 1970





COVER

Away out West they've
got some names for winds
you've never heard of.
See page 8.

FAA AVIATION NEWS

DEPARTMENT OF TRANSPORTATION / FEDERAL AVIATION ADMINISTRATION

VOL. 9, NO. 5

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Lethal leftovers.

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Slide rule pilot.

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FAA AVIATION NEWS is published by the Office of Public Affairs, PA-20, Federal Aviation Administration, Washington, D. C. 20590, in the interest of aviation safety and to acquaint readers with the policies and programs of the agency. The use of funds for printing FAA AVIATION NEWS was approved by the Director of the Bureau of the Budget, July 14, 1967. Send change of address to the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, with a mailing label from any recent issue. Single copies of FAA AVIATION NEWS may be purchased from the Superintendent of Documents for 20 cents each. All printed materials contained herein are advisory or informational in nature and should not be construed as having any regulatory effect. The FAA does not officially endorse any goods, services, materials, or products of manufacturers.

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A tied-down light aircraft may suffer from wind-damaged control surfaces even when cockpit control locks are used. Inspect carefully after storms.

INSPECTION AIDS I

(A new series on maintenance problems of General Aviation aircraft, based on FAA Inspection Aids reports.)

Wind Warped Controls

The vulnerability of light aircraft tied down in the open is widely known. High winds and sharp gusts can cause control surfaces to "work" excessively, and may eventually produce worn or bent hinges. The result can be an airplane which flies erratically, or appears difficult to control with precision.

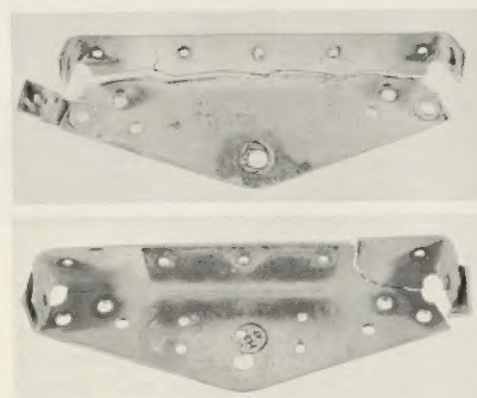
The best preventative consists of control locks, applied whenever the aircraft is to be tied down overnight or longer. Nothing is more unpredictable than the weather; a dead calm at sundown is no assurance whatever that a howling gale may not pass over the airfield before dawn; and it is most inconvenient to rise from a warm bed on a stormy night to tend to a buffeted bird.

Internal control locks, which are usually fixed to the control column, are the most common in use, since they can be affixed or released in a matter of seconds while the pilot is in the cockpit. They have one drawback, however, which has recently come to light in reports reaching FAA's Flight Standards Service from the field. Owners of some small, light aircraft have found that internal control or "gust" locks are not able

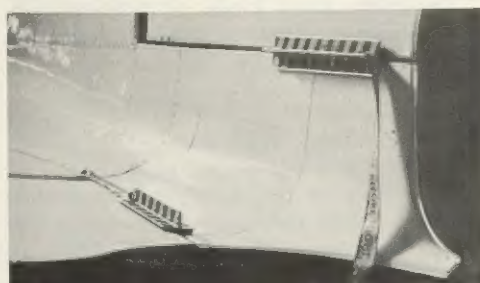
to fully immobilize control surfaces in strong winds, and some damage has occurred. In one case, fore and aft movement of the control wheel was also impaired, as a result of wind pressure on the surfaces straining the internal control lock.

The use of *external* locks, which are simple clamps that brace the ailerons, rudder and elevators (where applicable), will usually prevent this type of damage. External locks are less convenient, in that they take a little longer time to insert and remove, and they are occasionally overlooked by the careless pilot who skimps on the preflight and fails to remove them before attempting to take off, but they offer greater protection to very light aircraft than the internal lock. When in doubt, check with the nearest FAA GADO inspector.

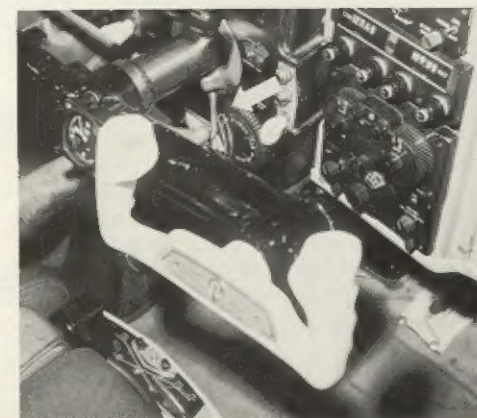
If the internal lock is used, it should be removed *before making the preflight inspection*, so that the coordinated movement of control surfaces can be checked by hand and eye. Attempting to rotate an aileron that is braced by an internal control lock can easily cause serious damage. Handle with care, as you do in the air. ■



Above—two examples of gust-damaged rudder hinges. Below—cracked rudder hinge bracket, result of "wind wear."



Left—pilot immobilizes rudder pedals by inserting pin. Above—external control locks on tail of DC-3, one of few aircraft still using such locks. Right—pilot inserts pin in control column to immobilize ailerons, elevator.





F-105 "Thunderchiefs" like these are typical of the high-performance fighters crisscrossing the U.S. in hundreds of flights daily along low altitude highspeed military routes. Flight times are unannounced.

TWELVE O'CLOCK LOW

Dont look for kicks on Route 306. Heavy Wagon routes have too many horses on the wing.

You think you are all alone up there, hedgehopping over spectacular mountain valleys in the western Sierras, when you catch a glimpse of a dark silhouette up ahead. For an instant a wild fantasy overwhelms you with the notion that a swept-wing monster with eight jet engines is driving toward you—and then suddenly you know it is not a fantasy but a real live B-52, and you are diving for the deck. You spin your wheels on the grass pulling out over the valley floor and you hightail it out of there as fast as the 108 horses in your little Yankee will take you. Wow!

Later, when you've stopped sweating and calmed down enough to cut back the rpms to cruise, you wonder if it really happened, or whether it was some kind of mirage. Nothing on your charts or NOTAMs. . . .

But after the pilot had landed at Reno and was leafing through the Airman's Information Manual at the FSS, he came to the sobering conclusion that he had blundered onto special military operations "Heavy Wagon" route 306, and the jet bomber he had barely dodged had been no illusion. In point of fact, hundreds of military practice flights at various levels from just above the surface to the stratosphere take place over the United States every day of the year, over predefined routes and at specific altitudes.

So far, no collisions between military and civil aircraft on these routes have been reported, and everyone concerned would

like to keep it that way. Each individual pilot has the responsibility for knowing about the special operations routes in his locality and over the area he will be flying through.

Military aircraft on practice bombing runs may be traveling as fast as 500 knots indicated—over 600 miles per hour on a typical summer day at 2,000 feet. At that speed, the minimum five miles visibility the military permits itself in VFR weather is adequate to give a pilot of the high-speed aircraft a little more than 30 seconds to spot and avoid a stationary target. If he's approaching a small aircraft headon the see-and-avoid time would naturally be greatly reduced.

Three Kinds of Routes

There are three kinds of military low-level high-speed training routes that general aviation pilots should be familiar with.

- Heavy Wagon
- Oil Burner
- Low Altitude High Speed VFR

The first two are described and charted in Part Four of the Airman's Information Manual. All of the routes are charted on special military charts—the FLIP (Flight Information Publication) charts issued by the Air Force. They are not shown on ordinary navigation charts.

Seven out of the eight Heavy Wagon routes are located in the West—in California, Oregon, Nevada, Washington,

Montana, and Idaho. The eighth is in the Kentucky/Tennessee area. Flown in both IFR and VFR weather, these routes give military airmen practice in high speed, low-level navigation, electronic equipment evaluation, and weather evaluation flights. Because of the nature of the missions—some of which involve the use of terrain-following radar—these routes are located in rugged terrain where the pilots can get plenty of hill-hugging experience.

The 300-series Heavy Wagon routes are contained within nine nautical miles on either side of centerline, except for FR segments, which will be contained within four nautical miles on each side, unless otherwise shown on the charts. Maximum altitudes flown are indicated on the charts, and the flights may be as close to the terrain as 500 feet when there is at least a 3,000-foot ceiling and five miles visibility.

(All ceilings are measured with respect to height above terrain, not to pressure reference plane.)

The 400-series Heavy Wagon routes operate substantially the same as the 300-series, except that flight will be *between 500 feet above terrain* and the minimum obstruction clearance altitudes published on the charts in AIM. The route widths are two nautical miles on either side of centerline at the contour altitude, and four miles at the minimum obstruction clearance altitude.

The 19 Oil Burner routes scattered across

the U.S. are also flown both in IFR and VFR weather. Mostly low level navigation and bomb run training flights, they are flown at the altitudes published in AIM and FLIP Section IIA. At the end of the low-level portions of the routes, aircraft will conduct simulated bomb-release maneuvers in the bomb run corridors depicted. Maximum altitudes are shown for these. Most of the bomb runs, "Short Look" or "Lay Down," are conducted from 4,000 to 6,000 feet MSL. A few are "Long Look" simulated bomb runs at 18,000 to 21,000 feet MSL.

On some Oil Burner missions, aircraft will descend to an altitude as low as 500 feet above the terrain in daylight hours, and 800 feet at night. Like the Heavy Wagon routes, these very low runs are flown VFR only when the ceiling is at least 3,000 feet and the visibility is at least five miles.

The third category of low-level high speed routes is also used for navigation and weapons delivery training by the armed forces, but these are too numerous to chart in the AIM. There are hundreds of them from coast to coast, and border to border which are flown VFR at 1,500 feet and below at speeds in excess of 300 knots.

FLIP Charts at FSS

Three-part FLIP charts showing these routes are available from the Coast and Geodetic Survey (Distribution Division C-44), Washington, D.C. 20235. The cost is \$2.00 each or \$24.00 per year for renewals and subscriptions. Flight Service Stations keep current editions on hand available for pilot reference. Also, the military services mail these charts to about 8,000 airports in the adjacent 48 states in order to reach as many civilian pilots as possible.

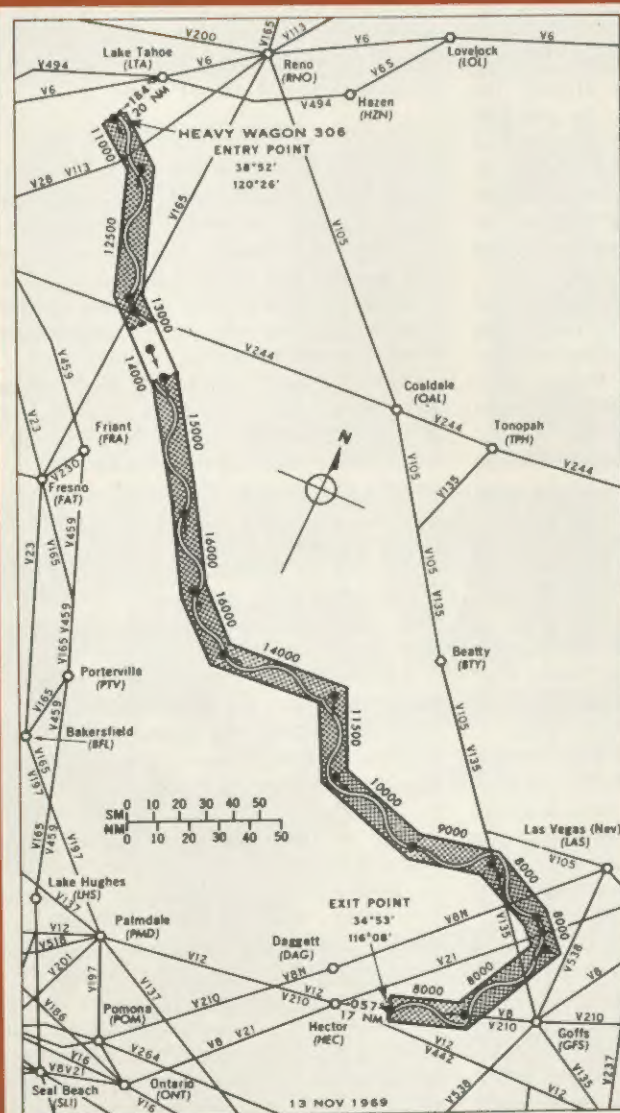
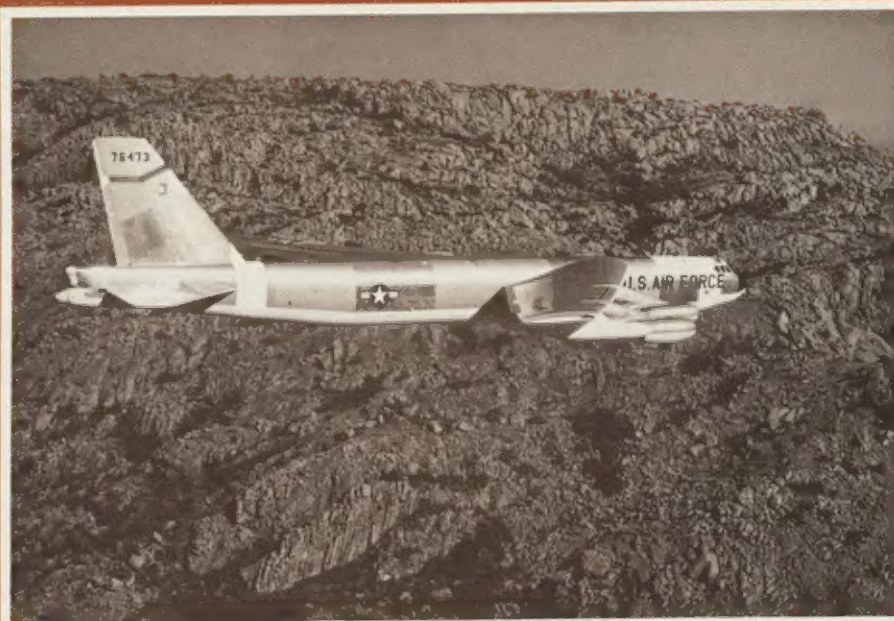
Flight service stations and many fixed base operators also have reference copies of AIM, for printed information on Heavy Wagon and Oil Burner routes.

Generally, the exact times of individual flights or the number will not be known by the FSS in the vicinity of the Heavy Wagon or Oil Burner routes, but the station will be aware of any changes in operating hours or routing since last publication of AIM. This information will not, however, generally be available at flight service stations out of the immediate vicinity of the routes.

On a flight from St. Louis, Missouri, to Atlanta, Georgia, for example, the flight path may cross Heavy Wagon Route 301 in the vicinity of Knoxville, Tenn. The St. Louis flight service station normally would not know whether the 0030Z to 1300Z operating hours for the route had been changed, but an inflight check with the Knoxville FSS before arriving over the route would quickly tell the pilot whether it were "hot" or "cold."

Play it safe. Don't get your kicks on route 306.

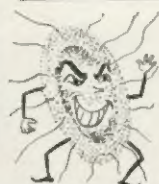
Don Byers



B-52 "Stratofortress" hugs rugged terrain during "Heavy Wagon" run that can bring it down to 500 feet above ground. Airspeed may exceed 500 mph. Left—"Heavy Wagon 306" as it appears in the AIM. Wavy line indicates terrain avoidance course.



Sly Staph & Slippery Sal



Even your best friends may not appreciate your tasty inflight snack if it hits them where it hurts.



At 8,500 feet the vacationing pilot and his student pilot wife were flying through clear skies over a landscape dotted with the blue-gray mountains of Montana. Glacier National Park, their destination, was some 300 miles northwest of Billings, where they had spent the night while the radio in their Comanche was being repaired.

In fact, they had lost most of that hot August morning hanging around the plane waiting for the radio to be checked out. But now, airborne at last on the final leg of their journey, they could begin to relax. Sandwiches bought and stowed on board early that morning were at hand, so that they could pick up time by flying through the lunch hour.

At 12:30 the holiday-bound pair sighted Great Falls, their halfway point. With ample fuel on board and an encouraging weather report from the flight service station, they continued without landing. They followed Victor 21 into Cut Bank, and then headed west over Marias Pass, climbing to 10,500 feet and following the railroad tracks over the Continental Divide.

The husband/pilot-in-command decided to maintain his altitude until he was well clear of the mountain range, since he was unfamiliar with the region and had a healthy respect for mountain turbulence. But after 30 minutes of flying "over ten" he began to feel unwell, so he began a gradual descent toward Flathead Valley.

But his condition worsened. He became sick to his stomach and suffered violent cramps. His skin became pale and clammy, with beads of moisture standing out on his forehead, and finally he was unable to hold the wheel any longer and slumped back into his seat, clutching his abdomen.

Fortunately, Glacier Park Airport lay dead ahead on virtually a straight-in approach, which his worried wife was able to execute, and a bumpy but safe landing was effected on the east-west runway. A frantic call for help blurted out over the radio to UNICOM brought medical help onto the field, and the ailing pilot was taken to

the hospital in an ambulance.

The medical attendants had no difficulty diagnosing his sickness: food poisoning. The ham sandwiches stowed on the aircraft that morning, after sitting several hours in a sunbaked cockpit, had developed a toxic level of bacteria before being eaten. Why was only the husband stricken, and not his wife? Most likely because she preferred cheese to ham sandwiches and disliked mayonnaise on her bread.

Safety Pilot Helped

Because a copilot was on hand, and because medical help and a stomach pump were quickly available, consequences of this case of airborne food poisoning were not serious. But the warning is clear to all vacationing flyers: the summer season is also the season when food contamination is most rampant.

Actually, food poisoning may occur at any season, but it is most likely to occur during the months when the days are hot and damp—the ideal climate for rapid growth of bacteria. The most common type of food poisoning is due to the *staphylococcus bacillus*, which produces a enterotoxin that is extremely distressful to the human intestine. Although fatalities are rare, incapacitation may cause a pilot to lose control of his aircraft.

Foods which are most subject to *staphylococcus* bacteria infestation are custards, cream soups and sauces, cream pastries, cake fillings, and mayonnaise. In summertime it is frequently not possible to keep these foods under proper refrigeration at all times. A few hours of exposure at room temperatures or higher is sufficient to permit a toxic condition to develop. Symptoms, such as those suffered by the pilot bound for Glacier Park, usually appear from two to six hours after eating.

Salmonella bacteria, another common cause of food poisoning, prefer the leaner foods, such as improperly cooked chicken, turkey, salmon, eggs, ham, etc. Unless meat is thoroughly cooked, *salmonella* may be only temporarily weakened by exposure to

the fire, and may regain their vigor and proliferate in a warm, moist environment such as the interior of a waterproof wrapper in a warm cockpit. Symptoms, similar to those associated with *staphylococcus*, are slower to appear; the first signs of distress may occur 12 to 24 hours after eating contaminated meat.

A third form of bacterial food poisoning, botulism, is rarely encountered, which is all to the good, since mortality may be as high as 65 percent. Botulism occurs mainly from eating improperly canned or preserved non-acid foods. Bulged or swollen cans, or the appearance of spoilage in glass containers, discoloration or pronounced odor are danger signals. Such food containers should be discarded. "Staph" and *salmonella*, incidentally, give no warning whatever as regards taste or appearance.

Victims of suspected food poisoning need professional medical attention; in severe cases acid imbalance, prostration or shock may take place. Complete recover may take several days; flying during the recovery period is not recommended. The anti-spasmodics and sedatives used in controlling the ailment could seriously interfere with pilot performance. (See "Pilots and Pills," May 1970 FAA AVIATION NEWS.)

Infrequently as food poisoning may occur, the airline precautionary measure of never serving both pilots the same meal should not be ignored. Light aircraft are usually without the protection of refrigeration or cabin air conditioning; consequently the opportunity for food on board to go bad is greatest in general aviation. This does not mean that vacationing pilots or those on long cross-country trips should entirely forego the picnic lunch. By avoiding creamy or custard type desserts, by selecting only sandwich meats that are obviously well cooked and free of mayonnaise, and by scrutinizing preserved foods with a sharp eye, the hazards of inflight incapacitation by food poisoning can be reduced virtually to zero.

A "bugged" snack could spoil your whole vacation.



Hot weather and cold cuts may prove to be a lethal combination for the vacationing pilot and his family who are unaware of how the sly staphylococcus and salmonella bacteria infest food. Both strike without warning and both are capable of rendering a pilot unable to control his aircraft in a critical situation. Separately prepared snacks for you and your flying partner might not be a bad idea, but there are less drastic precautions that will help protect you from airborne food poisoning.



Mountain ridges create "waves" of wind, just as reefs do at sea. Steer clear!

Something was wrong. The four-place float plane was simply not climbing out over the pass with its customary zeal. The pilot had taken off from the mountain resort lake at dawn, with two passengers who had to be at work in the city at nine that morning. Now an hour later, it did not look as though they were going to make it. At 9,000 feet the aircraft was rising sluggishly, and the jagged details of the granite ridge were uncomfortably close and clear; the passengers were stirring uneasily, thinking the same silent thought: something was wrong.

But what? The engine sounded fine, the gauges all read normal, the weather was clear and the lake had been calm on the takeoff. The pilot had made the same trip a dozen times over the summer, every Sunday afternoon since June as a matter of fact, and he had never had any trouble clearing the 10,000 foot pass with several thousand feet to spare. What was different about this morning?

The answer to the puzzle, ironically, was contained in that last word—*morning*. The pilot was in the habit of flying in and out of the mountain resort valley on Sunday afternoon; this was his first early morning flight, and although weather conditions appeared to be familiar to him, they were in fact very different. Instead of being boosted by a rising "valley wind," he was now encountering a downward flowing "mountain breeze," which flowed over the dew-chilled upper slopes down toward the warmer lake area. The solution, as the pilot gradually recognized, was to gain more altitude over the lake before entering the pass. He did so, and had no difficulty reaching his minimum safe altitude en route.

Valley winds and mountain breezes are two phenomena that all pilots who fly over mountains should know about. The valley wind is essentially an updraft, which begins to flow in the afternoon, caused by the difference in temperature between the sun-baked peaks and the cooler shaded valleys below. *Valley winds flow upward from the valley.* After sundown, as the peaks cool rapidly, a reversal of wind flow may take place. The cooled air becomes more dense and sinks; it may turn into a downdraft moving from the peaks to the valleys below, where bodies of water or heavy tree stands have conserved the heat absorbed during the day. Mountain breezes (downward) are strongest between midnight and dawn.

The downdrafts caused by cooling upper air are distinct from *mechanical* downdrafts, although one may reinforce the other and cause serious problems to the unsuspecting mountain flyer. Mechanical downdrafts (and updrafts) are created by fairly strong winds blowing over sudden rises in fairly level terrain, such as bluffs, high stands of



Valley High—Mountain Low

Mountain Winds are as inconstant as the day is long.

trees or man-made obstacles (barns, hangars, etc.). Such downdrafts become noticeable to small aircraft, when winds reach a velocity of 15-20 MPH. The changes in wind structure over an obstacle to windflow may extend upward as high as 20 times the height of the obstacle—i. e., a bluff that juts 100 feet above adjoining terrain can produce turbulence 2,000 feet above ground, in a very high wind.

Mechanical turbulence can be a problem in mountain flying where approaches to airports are limited by surrounding woods, hills or water—especially in the summer, when runway lengths are not as generous as they may appear, even in still air.

To the "flatlander" it might seem hard to

have any difficulty setting a light plane down on 2,000 feet of runway, but at a mile-plus elevation on a hot day the density altitude may be calling for as much as a 50 percent increase in the sea-level safe takeoff or landing distance. If the situation is at all marginal a slight downdraft at the wrong moment could make all the difference between clearing the trees on departure and not clearing them.

An innocent-looking silo or a picturesque old barn near the approach end of runway, in conjunction with a brisk wind, could produce enough of a downdraft over the strip to stall the aircraft into soggy ground preceding the threshold, unless power is added promptly. A stately stand of pines

near the far end of the runway could produce an unexpected updraft that results in an overshoot for the unwary pilot who did not touch down early enough. Mountain airports should always be looked over carefully from the air for mechanical obstructions that could create local turbulence. Landing short or running out of runway can be avoided if all of the runway is used to advantage and sudden changes in wind movement are anticipated.

The most severe form of turbulence found in mountain flying is the movement of air commonly known as the "mountain wave."

The mountain wave is the movement of air as it passes over the crest or upper ridgeline of a mountain that rises a mile or more

above ground. There is usually an updraft present on the windward side of the mountain, followed by a more or less severe downdraft on the lee side, and then a series of up and down drafts of diminishing intensity. The height above ground at which the turbulence can be felt will vary according to the elevation and sharpness of the terrain, and the prevailing atmospheric conditions. Some authorities recommend crossing mountain peaks with a clearance equal to 50 percent of the land elevation (crossing a 10,000 foot mountain at 15,000 feet) where this is practical. Where a smaller safety margin must be allowed, the pilot should be on guard against "wave" movements for at least 15-20 miles after passing

over the peaks or ridgeline. The movement of a mountain wave on the lee side of heights is similar to that of an ocean wave pounding the shore: the first break is followed by a variable swirling and frothing until the energy is expended.

Pilots are warned to expect mountain waves by the telltale clouds which usually (but not always) signal their presence. The ridgeline may be covered with a dense "cap cloud" beginning on the windward side and extending just over the crest. Flying through cap clouds is a sure prelude to an abrupt descent.

Overlying the turbulent air on the lee side of a mountain wave are apt to be found isolated "roll" or "rotor" clouds—devoutly to be avoided by light aircraft, since they are seething with updrafts and downdrafts packed into solid IFR conditions. Vertical gusts up to 4 Gs have been measured in this area.

Overlying the rotor clouds may be found several lenticular or bean-shaped clouds which, like foam on the ocean, call attention to strong wave action. Turbulence from high mountain waves may extend up to 40,000 feet. Whenever wind velocities in excess of 25 MPH are reported near mountain crests—and especially if the wind direction is somewhat at a right angle to the ridgeline—strong mountain waves should be anticipated, whether or not clouds are present.

The vacationing pilot who prefers to climb mountains rather than ride breakers should bear in mind that the seashore is not the only area that makes waves. Mountain tops and valleys are apt to be full of tricky gusts that can give the unwary pilot and his plane more roller coaster thrills than the vacation plan calls for.

Lewis Gelfan

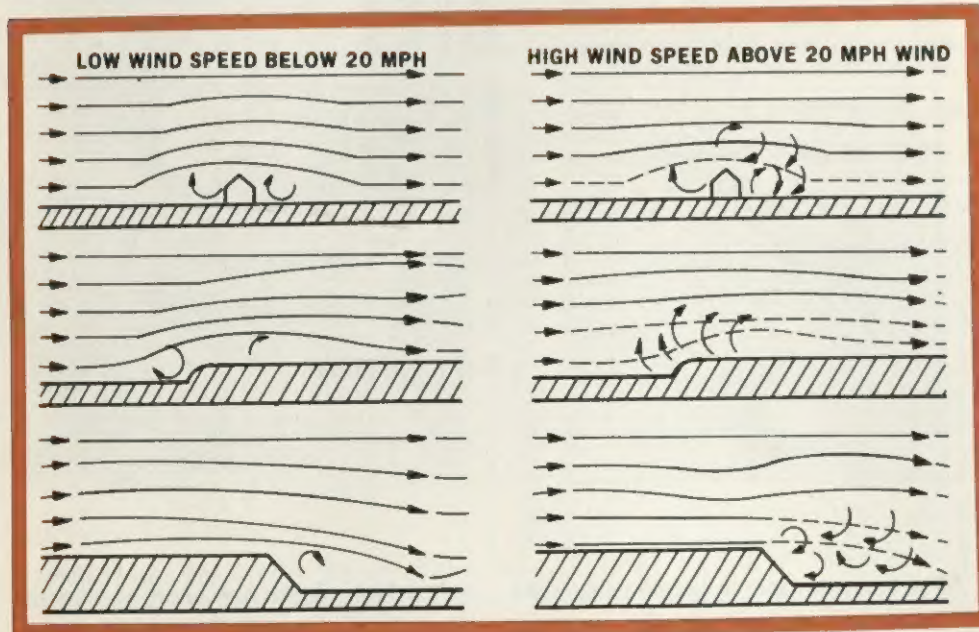
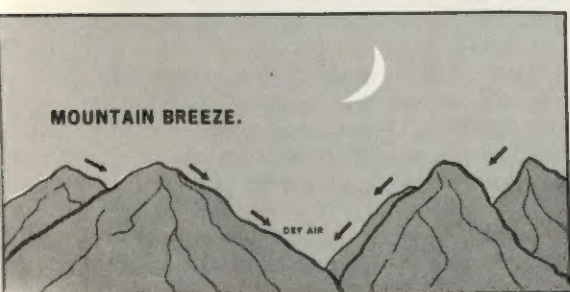
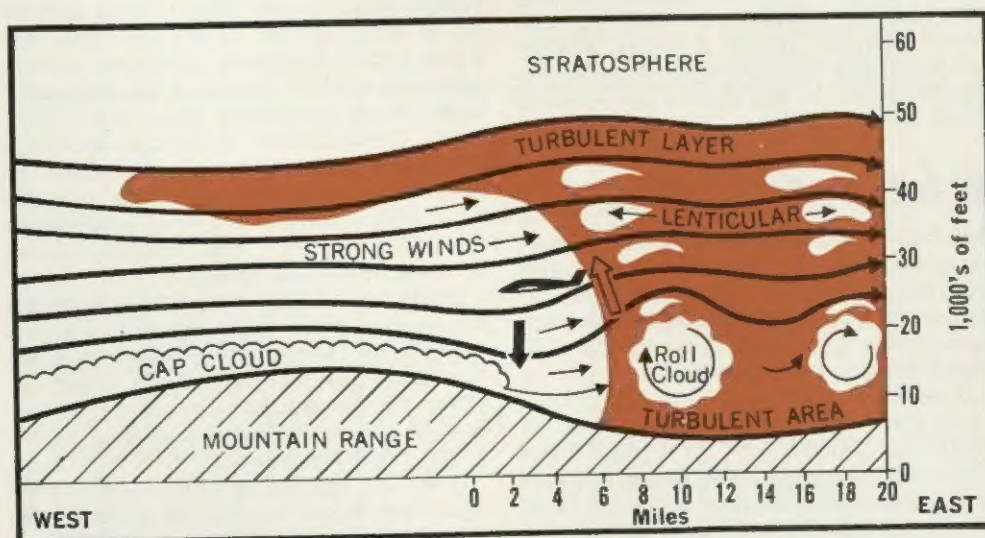
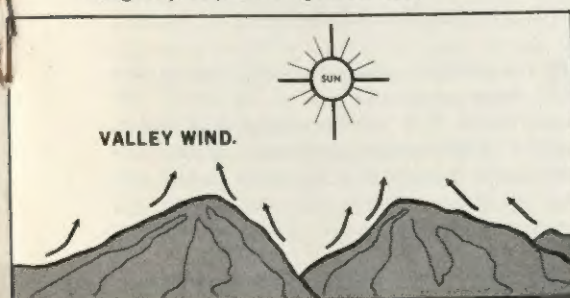


Diagram shows how surface obstructions cause eddies and other irregular wind movements.



Air warming near surface rises along the slopes. Cooling air near surface at night sinks along slopes, producing downdraft.



Schematic view of the dangerous air currents known as "Mountain Waves." Note the violent turbulence on the lee side. When wind velocities exceed 25 MPH, expect mountain waves.

(Diagrams courtesy of TAC ATTACK magazine)

Skydiving is something you have to do right the first time. Like general aviation flying, it does not require unusual physical endowments so much as a high degree of attentiveness to detail. Good physical conditioning will reduce the risk of landing injuries, but basically the jumper's safety depends on the effectiveness of his training and his ability to keep his wits about him at all times. From the moment he begins his pre-boarding equipment check his life is literally in his own hands, and the responsibility remains with him until the last fold is carefully tucked into his parachute pack. Making one sloppy fold, or overlooking one bent release pin in the pack can make a great deal of difference in the way he comes down.

Most parachuting accidents occur, understandably, among beginners. While some states have established minimum ages for participation in this sport, no governmental qualifying certificate is required. Federal Aviation Regulations affect the jumper's use of aircraft, equipment and airspace, but each individual has the right to decide for himself when he is prepared to step out of an aircraft aloft and make his way down to earth solely with the aid of a nylon canopy.

FFA does publish an advisory circular (AC 105-2) which recommends certain safety practices for "intentional parachuting" and explains the pertinent FARs. The safety recommendations are particularly directed toward the novice jumper and his pre-jump training.

As a first step, all would-be parachutists are urged to complete a general physical examination. The physician should be informed of the purpose of the exam. Falling through space at speeds over 100 mph exerts considerable stress on the human body—normally without ill effect, providing there are no unsuspected systemic weaknesses. FAA-designated Aviation Medical Examiners are well qualified to make this determination, in the absence of a family physician.

FAA recommends that the first jump be preceded by a review of the Federal Aviation Regulations on sport parachuting and by familiarization courses on types of parachutes, the use of jump aircraft, parachute instruments and accessories, landing falls (preferably from a jump platform) and emergency procedures.

Training is usually given at jump centers, or by clubs operating at centers, most of which are affiliated with the United States Parachute Association. The length and type of training offered will vary from one locality to another. Determination of when a jump candidate is ready to go aloft is usually made by the safety officer of the club or center. Beginners are strongly advised to make their first jumps under this type of supervision.



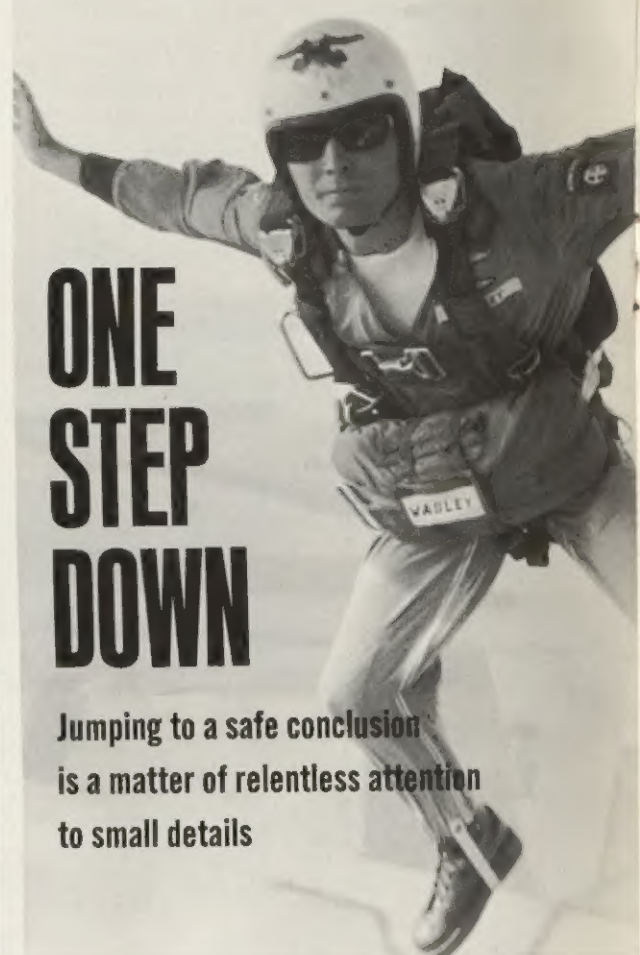
Above—"buddy system" equipment check prevents overlooking little details that insure safety. It is the mark of skilled 'chutists. Below—feet and knees together, jumper demonstrates landing technique.



Most beginners will be permitted to make their first jump after a full day of indoctrination and ground practice, assuming that wind and weather conditions are favorable. Jumpmasters are not likely to take students up if wind velocity is stronger than 6-8 knots, since it is difficult for novices to steer toward touchdown areas or to land softly under windy conditions. Most sport chutes have a forward speed of 4-6 mph, according to the chute design. If the novice failed or forgot to manipulate his canopy into the wind while landing, his forward speed would be added to the wind velocity, almost doubling his landing speed.

Students at USPA affiliated jump centers are made familiar with the parachute harness and the two chutes attached to it before they step into an aircraft. They are shown the disassembled main chute and told how to deal with fouled lines and incompletely expanded canopies.

They are trained to check each other's equipment before leaving the ground, both front and back, seeing that each snap hook is securely shut, each release pin is straight and free. They are taught how to move out of the jump plane, bracing their feet and hands before stepping back. They are shown how to control the direction of their descent



ONE STEP DOWN

Jumping to a safe conclusion is a matter of relentless attention to small details

with canopy guide lines, how to face into the wind before landing, and how to take the landing impact on their muscular structure rather than on their bones. They are shown how to check the emergency chute they rent for date of last inspection and unbroken seal.

They are also prepared for landings into trees or water or wire, the three chief landing hazards of the beginning skydiver, whose sense of canopy control has yet to develop. These hazards are minimized when using a club jump center with a well chosen drop zone. Unless the chutist is certain there is no water whatever near the landing area, he is advised to wear some type of flotation gear. Even small ponds or swamps could cause serious problems for the jumper encumbered with harness and unmanageable folds of parachute cloth.

At a further stage in their training students are shown how to "cut away" the main chute, if it becomes hopelessly fouled, before releasing the emergency chute. They are shown how to help the latter unfold into the slipstream when released, since the emergency chute does not have a pilot chute to pull the canopy out.

Reacting properly to an emergency aloft



Veteran competition jumpers Michael Wasley and Scott Richards enroute to jump zone. Wasley's wrist altimeter has danger sector on altimeter clearly marked. Tube tucked into Wasley's jump suit is rolled tissue used to gauge wind in group jumps such as baton passing. **Below**—proper exit technique is rehearsed on ground before initial jump. **Left**—moment of truth.



is undoubtedly the crucial test of a skydiver's training. If his chute fails to open properly he has only a few seconds to determine what is wrong and what should be done to arrest his fall. (From the approximately one half mile distance above ground recommended for beginner's jumps, time to ground zero without a deployed chute is only about 20 seconds.)

In such an emergency the jumper may find himself falling through space at speeds over 120 mph and perhaps tumbling or twirling about. Survival requires the ability to react unhesitatingly in the correct manner.

Most experienced jumpers regard all skydiving accidents as *potentially* survivable—providing that participants observe all FAA and United States Parachute Association rules and recommendations strictly to the letter. Your chute *might* deploy fully even without an habitual prejump examination—you *might* survive a jump through clouds, or over water without flotation gear—and then again you *might* run out of luck. It only has to happen once.

FAA Advisory Circular 105-2, "Sport Parachute Jumping," containing a detailed explanation of Federal regulations and recommendations on skydiving, is available free from the DOT/FAA Distribution Unit, TAD 484.3, Wash. D. C., 20590. ■

SUMMARY OF AUTHORIZATION/NOTIFICATION REQUIREMENTS

JUMPS OVER OR INTO:	AUTHORIZATION OR APPROVAL REQUIRED	WHERE TO OBTAIN OR GIVE NOTICE	WHEN TO APPLY OR GIVE NOTICE	FAR REFERENCE
Congested areas or assembly of persons	Certificate of authorization	FAA General Aviation District Office	At least 4 days before the jump	105.15
Airports	Prior approval	Airport Management	Before the jump	105.17
Control zone with tower	Authorization	Control Tower	5 min. before jump	105.19
Positive control environments	Authorization	Nearest ATC facility or FSS	5 min. before jump	105.21
Other controlled airspace	Notice only	Nearest ATC facility or FSS	1-24 hours before jumping	105.23
Uncontrolled airspace	(Same as above)	(Same as above)	(Same as above)	(Same as above)
Restricted, prohibited areas	Authorization	Agency in charge	Before the jump	105.27

SKY DIVER'S TIME TABLE (Static Line)

DISTANCE TO GROUND	TIME TO GROUND		FALLING RATE (Ft. Per Sec.)		FALLING DISTANCE (Free Fall)	
	Open Chute	Free Fall	Open Chute	Free Fall	Feet	Seconds
2800'		:20		16	16	:01
		:19		46	62	:02
		:18		76	138	:03
		:17		104	242	:04
2550'	2:07	:16		124	366	:05
		:15		138	504	:06**
2300'	1:55	:14	18-20'	148	652	:07
		:13	"	156	808	:08
		:12	"	163	971	:09
		:11	"	167	1138	:10
1800'	1:30	:10	"	171	1309	:11
		:09	"	174*	1483	:12
		:08	"	"	1657	:13
		:07	"	"	1831	:14
1300'	1:05	:06	"	"	2005	:15
		:05	"	"	2179	:16
		:04	"	"	2353	:17
		:03	"	"	2527	:18
800'	:40	:02	"	"	2701	:19
		:01	"	"	2875	:20
300'	:15	:00	"	"		
			"	"		

GROUND

*120 MPH.

**If main chute does not open in 6 seconds, remedial action must be taken.

Eastern Region, Safety Education Bulletin No. 4 (Modified)

Famous FLYERS

He saw his first airplane in 1910 as a gangling boy of 12 while rubbernecking at a Kansas county fair. The rickety wire, wood and fabric contraption that looped-the-loop and sailed low over an acre of sunburned faces lit a fire in his imagination that time has never banked. Fourteen years later he would be a successful aircraft designer in partnership with the pilot of that same airplane, the legendary Clyde Cessna. His own name was to become emblazoned in the memory of thousands of youths during World War II who learned to fly in the blustery open cockpit biplane called the Stearman trainer.

Now 71 and occasionally but erroneously presumed dead, Lloyd Stearman is still hard at work on revolutionary aircraft designs. During his more than half-century career in aviation, he has shuttled back and forth from Kansas to California, trailed in and out of more than a dozen companies, and ricocheted from design desk to president's suite and back again. Today once more he is Chairman of the Board of the newly formed Stearman Aircraft Corp. with headquarters in Washington, D.C. His nimble slide rule is credited with the birth of more than a score of aircraft types, ranging from trainers to mail planes, transport aircraft and space vehicles. During a brief respite from aviation in 1950, he designed a cotton picker attachment with a self-adjusting head that would remain at a constant height above ground, and a mowing machine that cuts down alfalfa at a 20 mph clip.

Lloyd Carlton Stearman was born on October 26, 1898, in Wellsford, Kansas, a dusty cowtown 50 miles from rough-and-tough Dodge City. His father, a carpenter with a reputation as a dedicated builder, instilled a love of tools and craftsmanship in his son. But that day at the fair and the sight of Clyde Cessna looping the loop turned his head skyward—for good.

His practical-minded father packed him off to Kansas State University with instruc-

Lockheed Aircraft produced the air carrier "Vega" for American Airways during tenure of Lloyd Stearman (dark suit) as President.



Above—the PT-17 Kaydet Primary Trainer, a 220 HP primary trainer built by Stearman Division of Boeing in Wichita for Army Air Corps in World War II. Right—Lloyd Stearman testing an aircraft in 1924.



The Fastest Slide Rule in the West Created The **YELLOW PERIL**

tions to bring home a degree in architecture, a goal that young Lloyd found agreeable. But he set his books and drafting tools aside in 1918 to become a pilot officer in the Navy.

When World War I was over, Stearman returned to Kansas but not to college. He was offered a job as draftsman and mechanic in "Matty" Laird's struggling aircraft works in Wichita at \$21 a week, and he jumped at the chance.

Laird, a cut-and-try, self-taught flyer and designer, was handcrafting the "Swallow," a biplane of his own design that was easy to fly, economical to repair—and languishing for a lack of customers. Laird sorely needed a man with Stearman's drafting skill and the two hit it off immediately.

Laird, like many of the other early designers, sketched his designs full length on wrapping paper stretched out on a wall or on the hangar floor. Stearman set to work and quickly translated these into professional engineering drawings, something found only in large airplane factories. Stearman's status and salary improved at once. His pay soared to \$29 a week and he was made foreman of final assembly, and at last, foreman for "the whole thing."

Laird pulled out suddenly and Stearman found himself chief engineer. Within 90 days he produced the "New Swallow," a sleek three-place biplane entirely of his own design, incorporating into a civilian airplane for the first time an underslung radiator instead of the conventional nose radiator, prop spinners, and an experimental propeller. With Walter Beech at the controls, the "New Swallow" captured first place honors in the 1924 Dayton Air Races, beating out the runner-up designed by Glenn Martin.

With Beech and Clyde Cessna, Stearman formed "Travel Air" company in 1924,

assuming the position of chief designer. Stearman designed the first general aviation aircraft with a welded steel tube fuselage (the "Travel Air"). Partner Beech wielded the welding torch himself.

The design owed much to Tony Fokker, the Dutch design genius for the German air force in WWI. With its balanced "elephant ear" ailerons and distinctive tail surfaces, the "Travel Air" quickly became known as the "Wichita Fokker." The basic "Travel Air" sold for \$3,500, utilizing surplus military engines. Many, including the original, are still flying today.

In 1926 the three budding giants of aviation split up. Cessna struck out on his own and Beech threw in with Curtiss-Wright temporarily before setting up his own firm with the "Travel Air" imprint on his door. Stearman went to California and set up a new firm of his own, turning out the famed series of "Speedmails." Better financing soon lured him back to Wichita, where he prospered as a producer of mail planes.

The late '20s were turbulent, with many aircraft companies quietly giving up the ghost or seeking protection in numbers by merging. United Aircraft and Transport Co., a giant combine which included Boeing, Northrup, Pratt & Whitney, Hamilton-Standard, Vought, Sikorsky and United Airports, sought to add Stearman to its string.

Stearman asked \$2.5 million in United stock, a staggering sum at the time. United backed off but later agreed to the deal. In the meantime, however, Stearman stock slipped from \$150 a share to \$100, and at merger, to \$6. The Depression was on and airplane sales were the first to feel the crunch. Stearman managed to sell only four aircraft in 1931 and his \$400,000 Wichita plant was soon shuttered.

Back to California he went where an

unusual opportunity presented itself. The mighty Lockheed Aircraft Co. had foundered in the Depression.

Stearman, Walter Varney, Robert Gross, Carl Squire, Cyril Chapplet, R. C. Walker and Thomas Fortune Ryan III scraped up the \$40,000 (!) needed to buy the defunct firm and Lloyd Stearman moved in as president.

To Lockheed's established line of "Vegas," "Sirius," "Orions," and "Altairs," all single-engine, all-metal monoplanes, Stearman added another, of his own creation: the 10-place, twin-engine, all-metal Model 10, the famed "Electra," (precursor to the four-engine air carrier "Electras").

After three years Stearman, a man of action, tired of the administrative and executive details involved in running Lockheed, handed in his resignation. He was then 37.

For the next two decades Stearman alternated between running companies of his own and designing for other aircraft builders. His most popular success was his response to the World War II instant need for a mass-produced primary trainer for the Army and Navy. Descended from Stearman's earlier "Speedmail" and designed in its final form by Mac Short, a colleague, this famous trainer was produced by the Stearman Division of Boeing in Wichita.

Designated the N2S by the Navy, it quickly earned the nickname the "Yellow Peril" because of its canary yellow color and the wide-spread knowledge that it was most often seen in the white-knuckled grip of a novice. The Army Air Corps called it the PT-13 (and with a slightly more powerful engine, the PT-17).

More than 10,000 Stearman Trainers were built, 3,190 of which are registered with FAA. Of these, 1,348 are still classed as "eligible" to fly. Most of these are in agricultural service as crop dusters, but some are still used in aerobatics and sport flying.

In 1955, 20 years after he had walked out from behind the president's desk at Lockheed, Stearman decided to return. Spurning the easy way, he presented himself in the personnel office as a "walk-in" looking for a job. On the application form he listed the usual things: age, professional qualifications, etc. Under "Previous employment and job description with Lockheed (if any)," he wrote "President." He was hired as a senior design specialist.

After designing a winged rocket for Lockheed for interplanetary travel, Stearman left the company once more in 1969 to be with his own company, Stearman Aircraft. He is still designing radically new aircraft (a jet-powered interchangeable passenger/cargo/hopper STOL, the MP-15).

At age 71 he still has his eyes on the stars, and he is alive and well in Northridge, California.

Frank J. Clifford.

■ **OPERATION STORMFURY.** A moving airspace reservation extending from the surface upward will be established



near the center of certain tropical storms over the Atlantic, Caribbean Sea and Gulf of Mexico during the current hurricane season, extending until October 31. ESSA and DOD will be conducting experiments with storm behavior. Detailed NOTAMs will be issued 24 hours in advance.

■ **VFR ON TOP.** Transponder codes 1200 (below 10,000 feet) or 1400 (above ten) may be assigned in ATC clearances specifying VFR conditions on top, or when an aircraft cancels an IFR flight plan to go VFR, under recently amended air traffic procedures.

■ **SPARE PARTS AND STORED GOODS.** Aircraft operators are cautioned to examine closely all replacement parts and materials purchased from salvage or surplus stores. Certain materials, however "unused" or protectively stored, deteriorate with the passage of time or exposure to unfavorable environment. The person performing the maintenance must ascertain that the part is acceptable under FAR 43.13, unless appropriate written certification is attached. See Advisory Circular 20-62A, "Eligibility, Quality, and Identification of Approved Aeronautical Replacement Parts."

FEDERAL AVIATION REGULATION VOLUME XI has just been published, containing Parts 71, 73, 75, 77, 95, 97, 157, 169, and 171. These parts were listed as part of Volume X in the July issue of Aviation News. The new Volume XI, which deals mainly with air traffic procedures, is sold for \$2.75 by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. See October FAA AVIATION NEWS for a complete new listing of FARs.

■ **VOR/ILS CHANNELS TO BE DOUBLED.** FAA plans to double the number of NAVAID channels available by splitting the VOR/ILS channels in the 108-118 MHz band. The new plan, expected to go into effect on Jan. 1, 1973, will provide 200 channels available at 50 MHz intervals instead of 100 channels at 100 MHz intervals. The reason for doubling the number is to accommodate an increase in instrument landing systems as prescribed in the 10-year National Aviation System Plan (1971-80). An FAA Advisory Circular will soon be available on this subject.

■ **GRASS ON THE RUNWAY.** FAA security officers are helping crack down on the practice of flying illegal drugs over the border into the United States. FAA cooperated recently with Customs inspectors in seizing a stolen aircraft loaded with marijuana at Saginaw Airport in Fort Worth. Suspiciously mutilated or obscured "N" numbers on planes should be reported to the agency.





Small planes with big passenger loads

FAA May Certificate Planes According to Seating Limit

A proposed FAA rule to require aircraft manufacturers to provide maximum seating configuration as an operating limitation for all small airplanes is open for comment until October 5.

The proposal is part of a three-step plan to upgrade the level of airworthiness of small airplanes. The first step was taken in January, 1969, with the publication of interim airworthiness standards for small (less than 12,500 lbs. gross weight) airplanes capable of carrying more than 10 passengers. The second regulatory step in June, 1970, was an amendment to the air taxi operating rules consisting of more stringent standards for airplanes with more than nine passenger seats. The new standards included operating performance requirements approaching those applicable to large transports.

The present proposal would permit a change to take place in the method of certifying small aircraft. Previously airplanes weighing 12,500 lbs. gross takeoff weight or less were classified as small and made subject to Part 23 of the Federal Aviation Regulations; those over the 12,500 lbs. weight mark were type certificated under Part 25 (FAR) as transport category planes.

Once the rule goes into effect, all air-

craft, regardless of weight, with more than nine passenger seats would have to meet the more stringent certification standards of Part 25 (FAR) to receive type certification. These would include a more rigorous program of fatigue testing, the design and installation of birdproof windshield and tail assembly, and a more thorough crashworthiness testing program affecting passenger safety, greater ease of evacuation and fire safety.

The three-step rule change proposal was prompted by the realization that an increasing number of "small" airplanes, particularly those used by air taxi operators, utilize design, equipment and operating features similar to those used in larger transports. FAA feels that in the interest of safety the continued certification of all small planes, regardless of passenger capacity, under Part 23 (FAR) would be unrealistic.

FAA is soliciting comments on the proposed changes to Part 23 (FAR) as well as comments concerning Part 25 (FAR) requirements which may be considered inappropriate for small aircraft. Address FAA Rules Docket, (Notice 70-25, Docket 10405), GC-24, 800 Independence Avenue, S.W., Washington, D.C. 20590. The deadline is October 5, 1970.

Five Year Corporate Pilot Accident Record Reviewed

A five year review of corporate and executive aircraft accidents has disclosed that corporate pilots are less frequently responsible for causing accidents than other general aviation pilots, but still have a poorer record than air carrier pilots.

Studying the five-year period 1964 through 1968, the National Transportation Safety Board found that in 439 accidents involving corporate aircraft, pilot error was cited as a cause or factor in 57 percent of all accidents and in 61 percent of the fatal accidents.

Over a similar period involving 361 air carrier accidents, the pilot was cited in 42 percent of all accidents and in 53 percent of the fatal accidents. Over a recent three-year period, general aviation accident records showed pilot involvement in 82 percent of both categories of accidents.

The report, "Review of Corporate/Executive Aircraft Accidents, U.S. General Aviation, 1964-1968," is sold by the Clearinghouse for Federal Scientific and Technical Information, U.S. Dept. of Commerce, Springfield, Va., 22151, at \$3.00 a copy.

New FAA Statistical Review of Civil Airmen Published

A new FAA booklet devoted entirely to airmen statistics provides more detailed breakdowns of civil airmen statistical data than has ever been available before.

Entitled "1969 U.S. Civil Airmen Statistics," the publication shows for the first time: a comparison of active pilot certificates by category and age group for 1965, 1967-1969; charts and tables showing airline transport certificates held by selected age groups; information on student pilot issuance by month from 1967 through 1969; detailed statistics on women in aviation, age distribution of airmen, student starts, certificates issued by class of conductor, and non-pilot airmen data.

Air Taxi Commuter Operators Seen Leaning to Turbo-Prop Aircraft

Commuter air carrier operators, while still relying on multi-engined piston aircraft as the backbone of the business, significantly increased their use of turbo-prop planes over the past year. Figures released in a recent FAA publication showed that they were using 200 turbo-prop aircraft in 1969, depending heavily on the Beech 99 Airliner, the DeHavilland DHC-6 Twin Otter, and the Short Bros. SC-7 Sky Van.

A limited number of copies of the study, "Commuter Air Carrier Operators as of September 1969," giving comprehensive data on this segment of aviation, are available.

Copies of the two publications described above may be requested from the DOT/FAA Distribution Unit, TAD-484.3, 800 Independence Avenue, S.W., Washington, D.C., 20590. Enclose a self-addressed mailing label.



A FIVE ENGINE JET? Boeing is seeking FAA approval for the giant 747 jetliner to transport a spare engine on the wing to distant depots. Fifth engine can be spotted by absence of front turbofan section. Airspeed is reduced to about 520 MPH at cruise.

• No Fair Weather Pilot

Allow me to comment on Mr. Michael L. Pappas' letter in the April "Forum" in which he suggests excluding general aviation aircraft from high-density airports.

I am also a general aviation pilot with approximately 2,000 hours, piloting a business twin-engine aircraft based in Portland, Ore. Our reason for basing it at Portland International instead of one of the other airports that serve only general aviation is simple—better utilization of the aircraft in IFR weather.

When instrument approach facilities are installed at these other airports then, and only then, would we consider basing it elsewhere. Mr. Pappas seems to consider "general aviation" as a collection of weekend fair-weather pilots, which it certainly is not.

B. Paul Kornberg
Portland, Ore.



• A&P Ticket Validity

After graduating from an FAA-approved Airframe and Powerplant school I obtained an A&P certificate and then enlisted in the Navy. Just before I left the Navy I was informed that my A&P license was subject to expiration if I did not remain active in aircraft repair work. I've learned that this is not true.

However, I have been told that the policy has been changed, and that the license will expire at the end of a five-year period unless I remain active in aircraft maintenance. Is this true?

R. M. Gianamore
San Diego, Calif.

FAA-issued mechanic certificates do not have an expiration date. However, after a period away from the practice of the trade it will be to your advantage to check with an FAA maintenance inspector to determine your technical adequacy and recency of experience.

Federal Aviation Regulations Part 65, sections 65.81 and 65.83 pertain to the A&P responsibilities and privileges.

• First Lady of the Jet Set

The article "Aviation's Bloomer Girl" in the April FAA Aviation News was very interesting, particularly the sentence that stated when Blanche Scott was 61, she scored another "female first" by flying in a Shooting Star jet airplane, becoming the first woman to ride in one. The date given was Sept. 2, 1948.

On Feb. 9, 1945 I took my wife for a flight in a Bell YP-59A twin jet aircraft at Norton AFB, San Bernardino, Calif. I believe this was the first flight for a woman in a jet.

Charles M. Fischer
Lt. Col., USAF (Ret)
Santa Ana, Calif.

I regret having to take any honors away

from Blanche Scott but in the late fall of 1945 officers of the 412th Fighter Group (first jet fighter unit in the U.S.) were taking their wives for rides in the Bell YP-59 at Santa Maria AFB, Calif. The YP-59 was fitted with a passenger seat forward of the pilot in the nose of the aircraft.

E. Lesley Kelly
Belmont, Calif.

Mrs. Fischer appears to have the honors, unofficially. Any other claimants?

• TCA Chart Source

As suggested in "TCA and the VFR Pilot" in the August FAA AVIATION NEWS I went to my local FSS to obtain a VFR Terminal Area Chart and was told that only FSSs in Alaska sell charts of any kind. The facts, please.

Laurie Leonard
Scranton, Pa.

Terminal Area Charts, like other aeronautical charts, are available from authorized C&GS aeronautical chart agents or from the Distribution Division (C-44), Coast and Geodetic Survey, Washington, D.C. 20235.

• Wakeful Concern

I think it's high time for controllers to accept responsibility for the safety of aircraft that could be endangered by landing or taking off when turbulence could still be present.

A very simple wake turbulence indicating system would be a series of pennants or flags mounted on plastic staffs on each side of the runways.

Jonas Asplund
Eatonville, Wash.

Many of the accidents, or near accidents, occurring at airports apparently are caused when a light plane runs into turbulence following a jet takeoff or landing.

Would it be possible to use plastic streamers on flexible wands or poles along a runway to indicate areas of turbulence? This would be a visual indicator showing where the turbulence began and ended.

Chester L. Roberts, M.D.
Glendale, Calif.

I understand the purpose of a control tower is to maintain safe distances between aircraft and to provide a safe, orderly flow of traffic. However, controlling distances between aircraft cannot be the only factor that constitutes a clearance to land or takeoff because there is a trailing hazard (wake turbulence) that deserves equal concern.

Alvine Klein
Messapequa, N.Y.

New Air Traffic Control procedures provide a minimum of five miles separation for airborne IFR aircraft operating at the same altitude behind a heavy jet: that is, aircraft capable of 300,000 pounds gross weight at takeoff. Separation will only be provided to VFR traffic if FAA is positioning the aircraft. If the VFR pilot is positioning himself, ATC will issue a cautionary advisory. The new procedures will separate all departing aircraft, VFR and IFR, from heavy jets.

The suggestions for flags or streamers to indicate turbulence has been passed on to FAA's Research and Development Service for action.

FAA Aviation News welcomes comments from the aviation community. We will reserve this page for an exchange of views. No anonymous letters will be used, but names will be withheld on request.

• Pilot Know thy IFR

I agree with Edward W. Michalowski ("Face to Face with IFR," Flight Forum, February 1970 FAA Aviation News) when he says a large number of accidents happen when a non-IFR rated pilot flies into marginal VFR weather or solid VFR conditions. I disagree when he says that these pilots apparently have no fear of what might happen.

Many years of accident investigation has convinced me that pilots intend to do a 180 when the weather deteriorates but go too far and find themselves near the surface, mountains or otherwise, and close to the cloud deck. The pilot starts a 180, and because contact with the ground seems more of a hazard than proximity to clouds, he climbs during the turn.

Even if he climbs slightly when close to a cloud deck the illusion is that visibility has suddenly gone to zero, or nearly so, all the way to the surface. This is not taught in classrooms or printed in textbooks, but this phenomenon is very real and very surprising to the uninitiated.

J. T. Feeney
FAA Aviation Safety Officer
Salt Lake City, Utah

• Fuel Flow Facts

I would appreciate it if you would please tell me approximately how many gallons of fuel is consumed or used for each mile that a commercial jet airliner flies. I would like to know the average number of gallons of fuel per mile flown by a commercial jet airplane.

Albert Schatz
Temple University
Philadelphia, Penna.



Fuel consumption of commercial aircraft varies according to airplane size, weight, aerodynamic characteristics, cruise speed, cruise altitude, number of engines, engine size, and engine performance characteristics. There is no average fuel consumption figure for commercial jets.

However, fuel consumption for three representative aircraft might provide you with useful information:

Airplane Type	Estimated Fuel Consumption
Three engines (Boeing 727)	2.0-3.0 gallons/mile
Four engines (Douglas DC-8, Boeing 707)	3.5-5.0 gallons/mile
Four engines (Jumbo Jet)	6.0-8.5 gallons/mile

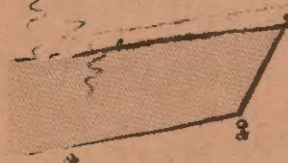
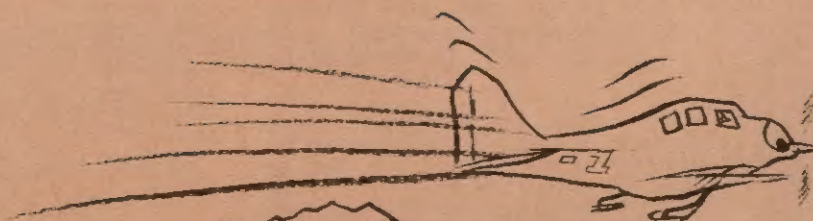
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When the air is not so dense

RO



Lift-off troubles may commence.

Suggested by John W. Forsythe
San Antonio GADO